



**Single-Molecule
Science**

From Super-Resolution
Microscopy to DNA
Mapping and
Diagnostics

6 - Posttranslational Protein Translocation through Membranes at the Single-Molecule Level

from Part II - Protein Folding, Structure, Confirmation, and Dynamics

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Chapter

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Summary

Protein secretion studies started in the 1950s with George Palade's electron microscopy (EM) work (Palade, 1952, 1975). Protein secretion is a very relevant process because more than 30 percent of synthesized proteins work in organelles or outside the cells (Arora and Tamm, 2001). In eukaryotic cells, the proteins secreted to the exterior are synthesized in the cytoplasm and transported inside the endoplasmic reticulum (ER), then pass to the Golgi apparatus and finally to secretory vesicles. Blobel and Sabatini in the 1970s discovered signal sequences at the N-terminus extreme of secretory proteins that allow them to be recognized by receptors thus mediating and facilitating their entrance to ER interior (Blobel and Dobberstein, 1975; Sabatini et al., 1982). Proteins enter the ER lumen by a protein conducting channel formed by a protein complex, known as the translocon, discovered in yeast in Randy Schekman's laboratory, which is universally conserved (Deshaies et al., 1991). In eukaryotic cells, the translocation of proteins into ER lumen is carried out by the Sec61 complex (Rapoport, 2007; Zimmermann et al., 2011), whereas the bacterial homologue is the heterotrimeric SecY complex, which allows the secretion of proteins to the exterior (Park and Rapoport, 2012).

Type	Chapter
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